

**PANEL STRUCTURE COMPRISING COUPLING MEANS, WHICH IS  
INTENDED FOR PRE-FABRICATED CONSTRUCTIONS**

**FIELD OF THE INVENTION**

The present invention is related to the construction industry, specifically to structural elements utilized in the system of construction of prefabricated building. More specifically it refers to a panel structure with coupling means, for prefabricated construction.

**BACKGROUND OF THE INVENTION**

Nowadays, in the construction industry and more specifically in the industry of prefabricated construction which is one of the fastest growing fields and which at present is gaining rapidly in importance due to the necessity of more economical, safe and resistant construction which can be completed over a short period of time, a diversity of prefabricated construction systems have been developed in which diverse elements of construction which are easy to assemble and which entail a reduction in time of the building in situ, using traditional manual labor, simple tools and which present optimum mechanical resistance, low costs, etc. are being developed.

This new technology has brought with it the development of new elements of construction which provide greater advantages y which are designed in order to satisfy the requirements of prefabricated construction

systems. One of these construction elements which has had the most development and innovation is the so called panel for the generation of various walls, which is where the inventive motif of the present invention is found.

Today various panel structures have been developed with these aims in mind. For example, there are some panels made of skimmed PVC with tongue and groove systems for coupling adjacent panels and for coupling with structural support columns of upper construction elements, panels for assembling central walls and corners, some of which are forms or boxes which when assembled must be filled with concrete in order to give them structure, conforming various walls; however, these required a process of cutting and grooving in tongue and groove form, sticking the parts together to give the required size for the modulation of the constructive system. On the other hand, the supporting columns were in plain view, thus requiring additional coverage in order to provide an esthetic finish. This process of cutting and assembling produced a large amount of wasted material.

For the abovementioned reasons, a structural panel with a coupling profile, for prefabricated constructions, which solves the aforementioned inconveniences and which also provides more structural and functional advantages with respect to existing panels, would be of great relevance for the construction industry based on the system of prefabricated construction.

## **OBJECTIVES OF THE INVENTION**

The present invention has as its main objective to make available a panel structure with means for coupling, for prefabricated construction, which provides greater facility for assembly and coupling between panels and with other structural elements such as columns.

Another objective of the invention is to provide said panel structure with means for coupling, for prefabricated construction, which also allows supporting columns and fixings to be hidden.

Another objective of the present invention is to provide said panel structure with means for coupling, for prefabricated construction, which also eliminates wasting material.

Another objective of the present invention is to provide said panel structure with means for coupling, for prefabricated construction, which also provides an esthetic and uniform exterior.

Another objective of the present invention is to provide said panel structure with means for coupling, for prefabricated construction, which also is the easiest possible to assemble at the construction site with adjacent panels which join one to another with pressure providing greater fixation and stability upon assemblage.

Another objective of the present invention is to provide said panel structure with means for coupling, for prefabricated construction, which also provides a profile design with maximum resistance and which can be assembled as a solid structure in itself.

Another objective of the present invention is to provide said panel structure with means for coupling, for prefabricated construction, which

also eliminates the use of soldering, screws, nuts and wedges as joining elements.

Another objective of the present invention is to provide said panel structure with means for coupling, for prefabricated construction, which also reduces to a minimum the amount of material required for providing maximum resistance to forces.

Still another objective of the present invention is to provide said panel structure with means for coupling, for prefabricated construction, which also implies low production costs and shorter manufacturing time.

Still another objective of the present invention is to provide said panel structure with means for coupling, for prefabricated construction, which also provides more resistance to loads, impact and drilling.

And all these qualities and objectives will become apparent upon studying the general and detailed descriptions of the present invention which are supported by the accompanying illustrations.

## **BRIEF DESCRIPTION OF THE INVENTION**

In the framework of the constant search to offer avant-garde products, structural panels with coupling means, for prefabricated constructions within a system of prefabricated construction, have been developed, in which the combination of metallic structures in the columns to be used in a construction system in combination with PVC panels according to the present invention, obtaining a product which contributes resistance and reliability on the part of the metal and durability and low maintenance on the part of the PVC.

Technology has always been a strategic factor for success and making use of the extrusion equipment for the production of panels made of PVC with the best quality in extrusion of skimmed PVC. The interest in using PVC emerges from the knowledge of the characteristics of the material together with the necessity for facing other competitors which are already using PVC in their construction systems. The possibility of counting on a material which can be manufactured in large quantities, industrialized style, represented a great business opportunity.

Due to its characteristics PVC contributes many advantages that may be incorporated into a construction element; said characteristics will be listed as follows: 1) Repellent to salinity, 2) Is flameproof, 3) Is easy to clean, 4) Resists moisture, 5) Increases its durability, 6) It works as wood does, 7) It is a thermal and acoustic insulation, 8) Insulates from high tension, 9) Aesthetically decorates interiors, 10) Aseptic material, does not generate pests, 11) Glass may be installed, 12) It may be painted with blended acrylic lacquer, 13) It may be used for advertising, 15) Its use is recommended on beaches, in clinics, hospitals, laboratories, schools, 16) It is lead free.

A first panel with a profile was developed to be used as intercommunicating doors, however the possibility of using it for walls was discerned and this required the addition of additives to give a better aspect to the finished work, these elements consisting of a series of column covers also made of PVC to cover the sides and ends of the columns.

Later on, a system of upper and lower separators was developed to modulate the original width of the panel, this modulation was applied to

various office walls where foundations and anchorage was not necessary, but where the panels make the structure itself.

The disadvantages of this panel made thought of a new design necessary in order to improve what had been obtained, said disadvantages being the following:

In order to assemble a wall to a modulation of the dimensions of this panel between columns required two pieces, where one of these is cut in order to form a complementary piece, this entailing waste that is not easily recycled.

The metallic columns are in full view with no possibility of hiding or concealing them.

Office walls require columns which are closer together, thus using more steel per square meter which adds cost.

The tongue and groove cuts made in the PVC panel make the joining points thin thus weakening the panel so much that at times it breaks.

The tongue and groove joint requires a perfect finishing on the inside of the profile of the panels, if not the cut cannot be carried out, thus provoking that many panels are disqualified from the process which makes for greater waste and reprocessing.

The tongue and groove joint was always noticeable even when there was specialized equipment to make the cuts.

Sticking the tongue and groove together required special cement for PVC which elevated the cost of the wall and required time to dry which slowed down the production process.

This made one think of a PVC profile which eliminated these disadvantages and which could be integrated into already existing construction systems.

The final proposal was submitted to exhaustive examination, resulting in the structure of panels with coupling means, for prefabricated construction with the following characteristics according to the present invention.

The panel structure with coupling means is designed to cover metallic columns in a construction system; the tongue and groove means for coupling is designed so that in the interior of a cavity generated in the coupling, a column is slid in, in the exact form, that is to say no other metallic column may enter in our profile due to its design form.

The joint between the two profiles was also designed in such a way that the joint is obvious, but esthetically so, we do not try to make it disappear but rather try to make it pleasant to the sight.

The panel of skimmed PVC, substantially rectangular in shape, is made up of various perpendicular and longitudinal internal ribs which form various substantially rectangular internal cavities, making up said panel, a lateral end with a substantially rectangular central projection and a front and rear extension of the configuration in a hook shape. The opposite lateral end makes a substantially rectangular central projection and a front and rear extension of the configuration in a counter hook; said central projections serve as coupling tongue means in both vertical canals as well as groove coupling means in the column; said front and back extensions

having a configuration in the shape of a hook and counter hook joined together and covering the support column on the front and rear.

In order to better understand the characteristics of the invention, a description of the accompanying illustrative drawings, as an integral part of the same, being these for illustration purposes only without being limitative of the characteristics and scope of the invention, are described below.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

Figure 1 shows a cross section of the panel with the end coupling means, for prefabricated constructions.

Figure 2 illustrates a top view of an assemblage between adjacent panels shown in Figure 1, coupled to a column adapted to receive and hold panels with said configuration.

Figure 3 shows a cross section of the panel as shown in Figure 1, coupled to a column on its lateral end which is made up of front and rear projections in the form of a hook, and with an element for covering the non concealed surface of the column.

Figure 4 shows a cross section of the panel as shown in Figure 1, coupled to a column on its lateral end which is made up of front and rear projections in the form of a counter hook, and with an element for covering the non concealed surface of the column.

In order to better understand the invention, we will now make a detailed description of some of the incorporations of the same, shown in the drawings which are annexed to the present description with illustrative, but not limiting purposes.



## DETAILED DESCRIPTION OF THE INVENTION

The characteristic details of the panel structure with profiles for coupling, for prefabricated constructions, are clearly shown in the following description and in the illustrative drawings which are annexed, the same signs used as references to show the same parts.

With reference to Figure 1 which shows a cross section of the panel with end coupling means, for prefabricated constructions. In said figure, panel 1 of substantially rectangular shape, consisting of various perpendicular and longitudinal internal ribs 2 which make up various substantially rectangular internal cavities 3, making up said panel 1 a lateral end with a substantially rectangular central projection 4, with a front extension 5 and a rear extension 6 with the configuration in the shape of an end hook 7 whose end points towards the inside part; the opposite lateral end makes up a substantially rectangular central projection 4 and a front extension 8 and a rear extension 9 of a configuration in the shape of a counter hook with a projection 10 partially toward the center and a reduction 11 which adapts to the end contour of said end hook 7 on the opposite side.

With reference to Figure 2 which illustrates a top view of the assemblage between adjacent panels shown in Figure 1, at once coupled to a column adapted to receive and hold panels with said configuration. In said figures, two panels 1 with the configuration described in Figure 1, are coupled to a column 12 conformed of two profiles in the form of "U" 13 with outer hooks 14 united opposite one another and generating both vertical canals 15 in which said central end projections 4 of the adjoining panels 1

are coupled; said front extensions 5 and 8, and rear extensions 6 and 9 of adjacent panels, with the configuration in the form of a hook and counter hook joined and covering the front and back of support column 12. Reduction 11 of projection 10 of the front 8 and rear extensions 9 of the side end of a panel 1 coupled to column 12, adapts partially to the end contour of said end hook 7 of the front 5 and rear extension 6 of the side end of another adjacent panel coupled to the opposite side of said column 12.

With reference to Figures 3 and 4, panels 1 coupled to a column 12 by means of said central lateral projections 4, either on its lateral end which makes up the front 5 and rear projections 6 in the form of a hook or on its lateral end with the front 8 and rear projections 9 in the form of a counter hook, and with a covering element 16 on the non concealed surface of column 12.

Said covering element 16 is made up of a "U" shaped configuration with two internal projections 17 in the form of a hook, couplable and hookable by pressure on the edges of each vertical canal 15 of said column 12 and whose outer arms 18 touch the outer side of said front projections 5 and 8, and rear projections 6 and 9 of the lateral ends which correspond to said panels 1, covering and hiding the rest of column 12 and providing an outer covering.

The invention has been sufficiently described so that a person with average knowledge of the field can reproduce and obtain the results which we mention in the present invention. However, anyone skillful in the field of the technique who completes the present invention is able to make

modifications not described in the present application, however, if for the application of these modifications in a determined structure or process of manufacturing the same, the material claimed in the following claims is required, said structures is considered to be contained within the scope of the invention.